

Trend Study 2-34-01

Study site name: Otter Creek.

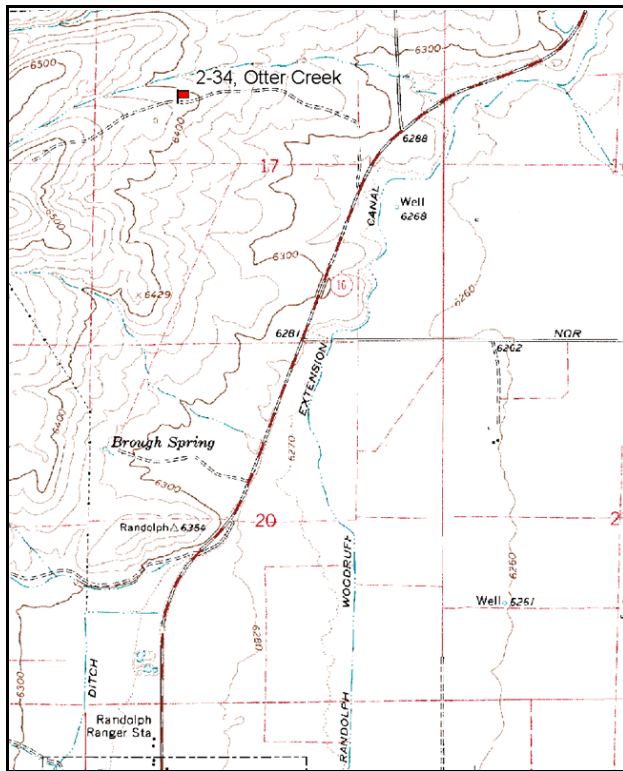
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 146 degrees magnetic.

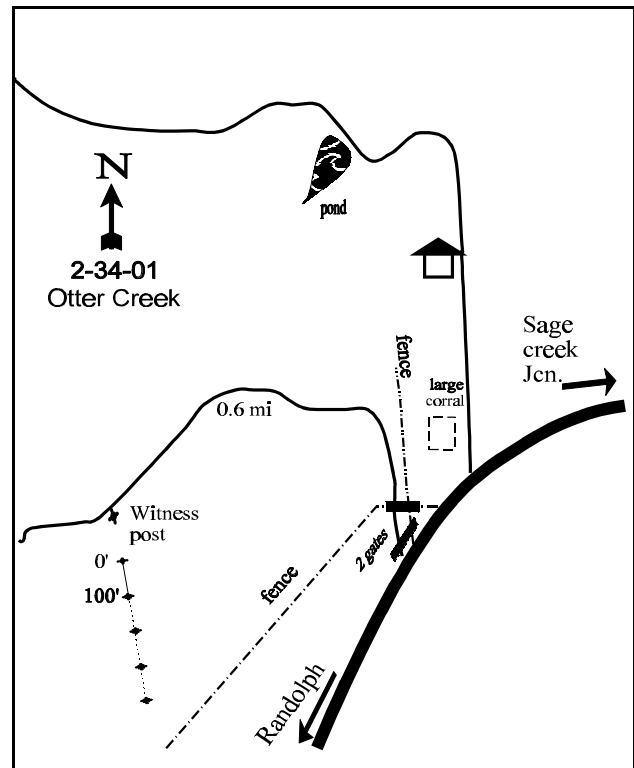
Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

## LOCATION DESCRIPTION

Proceed north from Randolph on U-16. Travel 1/2 mile past Nor Gray Lane. Turn left here, and proceed 0.7 miles from the first gate to a witness post on the left hand side of the road. From the witness post walk 15 feet at 160 degrees magnetic to the 0-foot stake of the baseline marked with browse tag #7977.

Map Name: Randolph

Township 11N, Range 7E, Section 17



### Diagrammatic Sketch

UTM 4616055 N, 484758 E

## DISCUSSION

### Trend Study No. 2-34

The Otter Creek study lies on critical deer winter range located approximately 2 miles north of Randolph. This is an area that formerly supported a climax Wyoming big sagebrush community typical of this area. The study area has been treated with herbicides or some kind of mechanical means to control sagebrush prior to 1984. In addition, crested wheatgrass has been seeded by a drill to increase forage production for livestock. This study should provide useful information about potential longevity and effectiveness of such treatments. The study site is at 6,410 feet in elevation on a gentle (5%), east-facing slope. Many different animals use the area which include cattle, sheep, deer, pronghorn, elk, and sage grouse. Pellet group transect data from the site in 2001 estimated 42 deer/pronghorn days use/acre (103 days use/ha) and 11 cow days use/acre (27 cdu/ha). Deer and pronghorn pellets were combined due to difficulty in distinguishing one from the other. Sage grouse droppings were seen on the site, although they were not picked up in the pellet group transect in 2001.

Soils in the area are described as the "Pancheri Silt Loam". This is a deep, fertile soil with agricultural potential. It also has the capability to produce abundant sagebrush forage. The principal problem is high susceptibility to wind and water erosion. A good plant cover is essential (Campbell and Lacey 1982). Soils at the study site have a loam texture with a neutral pH of 6.9 and limited organic matter (1.4%). Effective rooting depth (see methods) is estimated at almost 16 inches. There is little rock on the surface, but a calcareous layer becomes evident at about 10 inches. The study area is not badly eroded even though the amount of exposed bare ground is greater than on nearby undisturbed big sagebrush types. In 2001, an erosion condition class determined soils to be eroding slightly due mostly to pedestalling. After the original mechanical treatment and subsequent drill seeding, there has been minimal spread of crested wheatgrass from the original drill rows. The herbaceous cover provided by crested wheatgrass helps stabilize the soil.

Browse composition consists almost entirely of Wyoming big sagebrush, which makes up nearly all of the browse cover and half of the total vegetation cover on the site in 1996 and 2001. Density averaged 9,620 plants/acre in 1996 and 10,440 in 2001. Recruitment by young plants has been moderate to high in all sampling years. Currently ('01), young plants make up 12% of the population and are adequate to replace the decadent plants classified as dying in the population. Utilization has been mostly light to moderate during all sampling years. Percent decadence has fluctuated between sampling years. Nine percent of the population was classified as decadent in 1984 and 1996, but noticeably higher in 1990 (35%) and 2001 (41%). Vigor has been generally good except in 1996 when 87% of the population was classified as having poor vigor. However, this value may have been overestimated in 1996 due to most of the population experiencing early leaf drop. Sagebrush often drops leaves early during dry periods, and this condition should not be considered poor vigor. Leader growth was very minimal in 2001 averaging less than 1 inch, but seed production was good.

The herbaceous understory consists exclusively of perennial grasses, with the dominant species being crested wheatgrass. This species was seeded prior to site establishment and accounted for 81% of the grass cover in 2001. Sandberg bluegrass is the only other common perennial grass found on the site. Grasses showed a moderate level of grazing use in 1984, but current use appears light. Forbs occur rarely and produce about 1% average cover. Hood's phlox is the most abundant forb on the site with a quadrat frequency of 29% in 2001.

### 1984 APPARENT TREND ASSESSMENT

Soil trend appears stable to improving. Although little soil was lost during the time crested wheatgrass dominated the site, the species never expanded much beyond the original drill rows. This left a considerable

area of bare ground which should be reduced as big sagebrush increases. Vegetative trend depends on one's point of view. In an objective sense, the major trend is an increase in Wyoming big sagebrush and a concurrent decrease in grass productivity, vigor, and density.

#### 1990 TREND ASSESSMENT

This seeded Wyoming big sagebrush site shows a slight decrease. Young plants still make up a significant portion of the population, although the percentage of decadent plants has increased. Canopy cover is estimated at 14%. The sagebrush have been moderately hedged and have normal vigor. Crested wheatgrass has been heavily grazed by cattle. It shows a decline in sum of nested frequency, but quadrat frequency is still 100%. There is an excessive amount of bare soil and plant pedestaling is widespread. However, erosion is minimized by the gentle slope.

##### TREND ASSESSMENT

soil - down slightly (2)

browse - down slightly (2)

herbaceous understory - stable (3)

#### 1996 TREND ASSESSMENT

The soil trend is stable. Percent bare ground declined by 21%, but percent litter cover also declined by 28%. Soil pedestalling is evident on the site, yet sum of nested frequency of herbaceous vegetation remained similar to 1990 estimates. Erosion is minimized due to the gentle terrain. Trend for Wyoming big sagebrush is stable. Utilization is light to moderate and percent decadence low. Recruitment is good with abundant seedlings and young. The poor vigor found on the majority of the population appears to be a temporary condition brought on by prolonged drought conditions. Current cover for sagebrush is 16%. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses has increased slightly, while frequency of forbs has declined slightly. Nested frequency for the native Sandberg bluegrass has increased significantly.

##### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

#### 2001 TREND ASSESSMENT

Trend for soil is stable. The ratio of bare soil to protective ground cover has remained stable. Percent bare soil slightly increased as did litter cover. Erosion is minimal at the present time although pedestalling around sagebrush stems is evidence of past erosion. Trend for browse is stable. Wyoming big sagebrush density remains stable, and recruitment from young plants is adequate to replace the decadent plants classified as dying in the population. Vigor is generally good, although percent decadency increased from 9% to 41%. Increased decadency is likely due to drought and should improve with normal precipitation in the future. Use remains light to moderate. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses and forbs slightly decreased in 2001, but not enough to warrant a downward trend. Crested wheatgrass, the dominant herbaceous species, remains at a stable frequency.

##### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 02 , Study no: 34

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron cristatum	<sub>b</sub> 341	<sub>a</sub> 309	<sub>ab</sub> 310	<sub>a</sub> 300	100	100	98	94	11.62	10.64
G	Carex spp.	-	4	-	4	-	2	-	2	-	.01
G	Oryzopsis hymenoides	-	-	-	3	-	-	-	1	-	.00
G	Poa secunda	<sub>a</sub> 147	<sub>b</sub> 208	<sub>c</sub> 265	<sub>bc</sub> 227	76	87	93	79	5.29	2.48
G	Stipa comata	-	3	2	3	-	1	2	1	.01	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		488	524	577	537	176	190	193	177	16.93	13.17
Total for Grasses		488	524	577	537	176	190	193	177	16.93	13.17
F	Alyssum alyssoides (a)	-	-	<sub>a</sub> -	<sub>b</sub> 20	-	-	-	8	-	.04
F	Arabis spp.	-	-	-	1	-	-	-	1	-	.00
F	Astragalus utahensis	2	6	5	3	2	5	2	1	.03	.00
F	Calochortus nuttallii	-	-	-	2	-	-	-	1	-	.00
F	Cordylanthus ramosus (a)	-	-	-	2	-	-	-	2	-	.01
F	Erigeron pumilus	-	-	-	1	-	-	-	1	-	.00
F	Lomatium spp.	-	1	-	9	-	1	-	4	-	.02
F	Phlox hoodii	<sub>a</sub> 38	<sub>b</sub> 81	<sub>b</sub> 75	<sub>ab</sub> 58	16	35	32	29	1.16	.54
F	Phlox longifolia	<sub>a</sub> -	<sub>c</sub> 50	<sub>bc</sub> 31	<sub>b</sub> 25	-	19	15	10	.15	.10
F	Tragopogon dubius	-	-	-	4	-	-	-	1	-	.03
F	Trifolium spp.	<sub>b</sub> 29	<sub>a</sub> 4	<sub>a</sub> -	<sub>b</sub> 18	13	2	-	11	-	.05
F	Unknown forb-perennial	1	-	-	-	1	-	-	-	-	-
F	Zigadenus paniculatus	-	-	-	4	-	-	-	2	-	.03
Total for Annual Forbs		0	0	0	22	0	0	0	10	0	0.04
Total for Perennial Forbs		70	142	111	125	32	62	49	61	1.35	0.80
Total for Forbs		70	142	111	147	32	62	49	71	1.35	0.85

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

# BROWSE TRENDS --

Herd unit 02 , Study no: 34

Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata wyomingensis	98	94	16.12	11.36
B	Atriplex gardneri falcata	8	9	.06	.18
B	Chrysothamnus viscidiflorus stenophyllus	10	5	.60	.03
B	Eriogonum microthecum	1	1	.15	.03
B	Opuntia spp.	2	1	-	-
Total for Browse		119	110	16.93	11.60

# BASIC COVER --

Herd unit 02 , Study no: 34

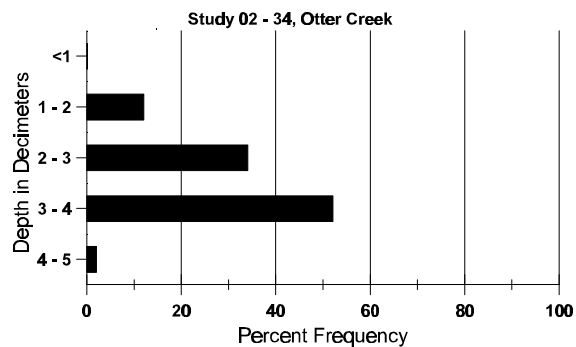
Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	362	344	13.50	5.00	36.29	28.72
Rock	3	6	0	0	.03	.01
Pavement	41	37	0	0	.22	.10
Litter	392	368	40.25	40.50	29.26	35.75
Cryptogams	161	169	0	.50	3.84	4.25
Bare Ground	348	337	46.25	54.00	42.42	46.36

# SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 34, Otter Creek

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.6	62.0 (13.6)	6.9	40.6	35.1	24.4	1.4	15.2	108.8	.6

# Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 02 , Study no: 34

Type	Quadrat Frequency		Pellet Transect	
	'96	'01	Pellet Groups per Acre '01	Days Use per Acre (ha) '01
Coyote	-	1	-	-
Sheep	3	4	44	N/A
Rabbit	1	-	-	-
Elk	7	-	-	-
Deer	14	23	539	42 (103)
Cattle	5	6	131	11 (27)

BROWSE CHARACTERISTICS --

Herd unit 02 , Study no: 34

Herb Unit 02, Study No. 57																	
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata wyomingensis																	
S	84	21	-	-	-	-	-	-	-	-	21	-	-	-	700		21
	90	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5
	96	18	2	-	-	-	-	-	-	-	17	-	3	-	400		20
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	84	84	71	2	-	-	-	-	-	-	157	-	-	-	5233		157
	90	51	13	-	-	-	-	-	-	-	64	-	-	-	2133		64
	96	61	14	-	-	-	-	-	-	-	10	-	65	-	1500		75
	01	63	-	-	-	-	-	-	-	-	63	-	-	-	1260		63
M	84	28	60	15	-	-	-	-	-	-	101	2	-	-	3433	17 28	103
	90	45	39	-	1	1	-	-	-	-	86	-	-	-	2866	15 14	86
	96	238	116	11	-	-	-	-	-	-	50	3	312	-	7300	16 23	365
	01	183	63	-	-	-	-	-	-	-	239	7	-	-	4920	15 22	246
D	84	6	14	7	-	-	-	-	-	-	27	-	-	-	900		27
	90	35	41	-	1	3	-	-	-	-	58	-	-	22	2666		80
	96	22	17	2	-	-	-	-	-	-	-	-	30	11	820		41
	01	107	106	-	-	-	-	-	-	-	200	2	-	11	4260		213
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	340		17
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	860		43
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'84		51%			08%			00%			-20%						
'90		42%			00%			10%			+20%						
'96		31%			03%			87%			+ 8%						
'01		32%			00%			02%									
Total Plants/Acre (excluding Dead & Seedlings)												'84	9566	Dec:	9%		
												'90	7665		35%		
												'96	9620		9%		
												'01	10440		41%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex gardneri falcata																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	1	-	-	-	-	-	-	-	-	-	-	-	-	33		1	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	96	9	-	-	-	-	-	-	-	-	-	-	-	-	180	4	10	
	01	12	-	-	-	-	-	-	-	-	-	-	-	-	240	2	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%			+82%							
'96		00%			00%			00%			+25%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	33		-			
												'96	180		-			
												'01	240		-			
Chrysothamnus viscidiflorus stenophyllus																		
Y	84	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	4	1	-	-	-	-	-	-	-	5	-	-	-	166	11	25	
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33	8	15	
	96	16	-	-	-	-	-	-	-	-	1	-	14	1	320	9	15	
	01	4	-	-	-	-	-	-	-	-	4	-	-	-	80	7	14	
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	20	-	-	-	-	-	-	-	-	2	-	-	18	666		20	
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	01	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		10%			00%			00%			+53%							
'90		00%			00%			86%			-51%							
'96		00%			00%			88%			-59%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	332	Dec:	0%			
												'90	699		95%			
												'96	340		6%			
												'01	140		43%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Eriogonum microthecum																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	-	-	-	-	20	6	11	1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	9	0
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%			+ 0%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	0%			
												'90	0		0%			
												'96	20		0%			
												'01	20		100%			
Leptodactylon pungens																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	33	44	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	0		-			
												'01	0		-			



A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	1	-	-	-	-	-	-	-	-	-	1	-	-	33	7 17	1	
	90	1	-	-	-	-	-	-	-	-	-	1	-	-	33	6 17	1	
	96	2	-	-	-	-	-	-	-	-	-	2	-	-	40	4 7	2	
	01	1	-	-	-	-	-	-	-	-	-	1	-	-	20	4 11	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%			+ 0%							
'90		00%			00%			00%			+45%							
'96		00%			00%			00%			-67%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	33	Dec:	-			
												'90	33		-			
												'96	60		-			
												'01	20		-			